

Skills Gap Identification of RAC TVET-Based Curriculum among Practitioners: Enhanced Module

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ABSTRACT

This research assessed the skills gap identified by the Refrigeration and Air-Conditioning (RAC) TVET-Based curriculum. The descriptive survey method of research was used in this research. Survey questionnaire was formulated to gather the needed data from the respondents. Further, percentages, weighted mean, frequency were used to analyze and interpret the data, and chi-square for the significant difference. The data revealed that there is a significant relationship between the profile and the RAC competencies of the group respondents. Moreover, the P value was more than to the level of significance. This implies that the profile of the respondents directly influence the competencies of the group respondents. It was concluded that the group respondents were not well knowledgeable in terms of common and basic competencies. Thus, there is still a need to improve their skills and knowledge in terms refrigeration and air-conditioning.

KEYWORDS: *Electrical Technology, RAC practitioners, Descriptive Methods of Research, Competency Standards*

How to cite this paper: Mateo A. Alin Jr. | Eugenio A. Ermac "Skills Gap Identification of RAC TVET-Based Curriculum among Practitioners: Enhanced Module"

Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-3 | Issue-6, October 2019, pp.1128-1132, URL:

<https://www.ijtsrd.com/papers/ijtsrd29224.pdf>



IJTSRD29224

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INTRODUCTION

With the development of our nation, there is a growing need of skilled manpower and vocational education prepares students for a job. Demand for skilled labor has increased both in business and government sectors. There has been a speedy increase in vocational education owing to the increasing demand of skilled professionals. Vocational education has immensely diversified over the period of time. Demand for skilled professionals has increased in various industries such as tourism, information technology, banking and finance, retail management, BPO, hospitality and traditional crafts (Bardach, 2019).

Moreover, technical and Vocational Education and Training (TVET) prepares people for the world of work. It has had a special role to play in providing young people and adults with the knowledge, skills, and competencies toward an improved quality of life (Maclean 2006). Attention to TVET is increasing worldwide as it can increase the productivity and income of the poor, enhance employability for the unemployed, and facilitate transfer to new occupations for those currently employed (Orbeta and Esguerra 2016; UNESCO 2016).

Meanwhile, the European research review of the benefits of vocational education and training (VET) is released at a time

when Europe is taking stock of the progress achieved in the Lisbon process and has launched a new strategy for growth and swift recovery from the economic crisis. Investment in human resources by education, training and other forms of learning is essential to achieving smart, sustainable and inclusive growth. VET will continue to play an important role in the shift towards more knowledge-intensive societies. Around half of all jobs in 2020 will require a medium-level qualification, which will often be achieved by some form of VET (European Centre for the Development of Vocational Training, 2011).

The development of competence-based assessment in the UK has been strongly influenced by the introduction of National Vocational Qualifications (NVQs) and Scottish Vocational Qualifications. The introduction of these qualifications has raised the profile of competence based assessment and, arguably, its credibility. But it is responsible for creating some misconceptions. Attempts to centralize and prescribe criteria and processes have stifled innovation and have restricted the wider application of and involvement in competence-based assessment, particularly at the higher levels. This article describes the background of competence-based assessment and NVQs and identifies some of the misconceptions which exist in this area. Taking the

Association of Accounting Technicians as a case study, the article aims to correct these misconceptions and demonstrate the real potential of competence-based assessment in vocational and professional contexts. Further, In the UK, interest in competence-based assessment began to develop in the 1970s. A number of factors influenced the growth of this interest. Unemployment was rising and concerns were being raised about the level of skills in the workforce. Young people, it was argued, were not being adequately prepared for work, and training for working adults was thought to be inadequate (Purcell, 2015).

In the Philippines, the Technical Education and Skills Development Authority (TESDA) is the national government agency managing and supervising the TVET system. It provides national leadership for developing a skilled workforce. It is particularly focused on middle-level skills development (semi-skills, skills, craft, and technician training).

TESDA has evolved into an organization that is responsive, effective, and efficient in delivering myriad services nationwide for TVET such as standards development, program implementation, assessment, certification, registration, and accreditation. The roots of TVET in the Philippines were established more than 80 years ago, but it has evolved primarily to provide postsecondary and noncredit technical vocational education and training. Those who do not choose to enter higher education often choose TVET to earn a National Certificate (NC) from TESDA, which leads to employment. The certifications are well recognized as nationwide employment credentials and are often required during the recruitment of skilled workers. However, NCs are noncredit and not transferrable to higher education. Additionally, with the country's recent shift to K-12 compulsory education, TVET education was integrated into senior high school through a TVET track in grades 11 and 12 to produce high school graduates with employable skills recognized in the workforce (TESDA, 2016).

One of the major development challenges for the Philippines is to prepare the youth (ages 15–24) for the workforce. The country is still facing low education, high dropouts, and unemployment, particularly among the youth. Technical and Vocational Education and Training (TVET) is the postsecondary education sector, providing noncredit, technical middle-level skills training to produce skilled workers. The Technical Education and Skills Development Authority (TESDA) provides national leadership for the TVET system by implementing competency-based curriculum standards, training regulations, and assessment and certification processes to ensure a high-quality TVET delivery throughout the country. With the country's recent shift to K-12 compulsory education, TVET education is integrated into senior high school to produce high school graduates with employable skills.

Moreover, those who do not choose to enter higher education after high school often choose TVET to earn a National Certificate (NC) from TESDA. NCs are well recognized as nationwide employment credentials and are often required during the recruitment of skilled workers locally and abroad, but are not applied or transferrable to higher education. The most prevalent connection seen between TVET in the Philippines and US Community

Colleges is through noncredit education. One of the primary differences is TVET's exclusive focus on workforce development programs leading to government-based certifications or credentials. While the majority of noncredit education in US Community Colleges is for workforce training, it is not the only focus, and the function allows colleges to use this flexible delivery method to meet a variety of community needs. While the conditions and educational configurations may differ between the Philippines and the United States, the strong connection made between education and employment is both undeniable and a national priority in each country (Budhrani and Espiritu, 2018).

According to Ermac (2016) the nature of work is changing rapidly due to new technology and work organization innovations. This has a dual effect by tending to dramatically reduce the number of low or unskilled positions available globally and additionally putting emphasis on the need to extend worker's skills over a shorter and shorter time frame. It is no longer sufficient to only have initial skills in say, a recognized trade as the changing nature of work will require individuals to regularly upgrade their skills or add completely new ones in order to remain fully employable. Most of this upgrading or addition of skills can be gained in a training centre or within the workplace but irrespective of how competency has been achieved it should be formally recognised in the same way as the initial trade skills. Work or qualification levels across the region skill standards developed in different countries have levels or hierarchies used to group the skills defined. In the Asia Pacific region these are usually based upon occupational classification structures and the particular qualification framework for that country. However, both of these vary considerably across the Asia-Pacific region and worldwide in terms of the number of occupational definitions, levels of qualifications, and terminology used.

Furthermore, Philippine government and DOLE have identified key employment generation and jobs to watch, there still exists a job-skills mismatch (Jaymalin 2016). The Trade Union Congress of the Philippines (TUCP) claims that the job-skills mismatch has been ongoing and has worsened in 2016; new graduates will have difficulty finding immediate employment due to additional hiring requirements and demanding additional qualifications that would require additional training for job applicants. This situation can discourage graduates seeking employment for the first time. However, there are numbers of RAC TESDA graduates who were unable to pass the heating, ventilating and air condition (HVAC) examination (Jaymalin 2016).

Technical and Vocational Education in the Philippines has still in the process of improvement specifically on the curriculum. This study will assess the skills gaps identify by the refrigeration and air-conditioning technicians in Metro Cebu. Thus, this study will be conducted.

BACKGROUND OF THE STUDY

This research is anchored on the Refrigeration and Air-Conditioning NC III competencies that a trainer or technician must achieve to enable him/her to install, service, maintain, troubleshoot and repair as well as to perform start-up, test and commissioning of air-conditioning and refrigeration units in commercial environment/ establishments other than centralized air-conditioning and industrial refrigeration systems. This includes the competencies of basic, common

and core competencies. To attain the National Qualification of RAC Servicing (PACU/CRE) NC III, the candidate must demonstrate these competences to achieve the vision and mission of technical and education and skills development in the Philippines and help the next future generation.

The RAC SERVICING (Packaged-type air-conditioning unit / Commercial refrigeration equipment (PACU/CRE) NC III Qualification consists of competencies that a person must achieve to enable him/her to install, service, maintain, troubleshoot and repair as well as to perform start-up, test and commissioning of air-conditioning and refrigeration units in commercial environment/ establishments other than centralized air-conditioning and industrial refrigeration systems.

The basic competencies refer to non-technical skills (knowledge, skills and attitudes) that everybody will need in order to perform satisfactorily at work and in society and are considered portable and transferable irrespective of jobs and industrial settings. These competencies are integrated with 21st century skills, referring to a broad set of knowledge, skills, work habits, and character traits believed to be critically important to success in today's world, particularly in contemporary careers and workplaces.

Moreover, common competencies covers the knowledge, skills and attitudes in identifying, requesting and receiving construction materials and tools based on the required performance standards.

Meanwhile, in core competencies, it covers the knowledge, skills and attitudes to safely install the main packaged-type air-conditioning unit (PACU) components and units as well as accessories based on manufacturer's recommendations. It also includes site survey, installation of electrical and piping systems.

In addition, refrigeration and air conditioning technicians' support maintain and help design air conditioning systems, often for large and complex buildings like factories. According to the Whole Building Design Guide, a RAC may also be referred to as a type of mechanical engineer of record. Refrigeration and air conditioning technicians primarily address seven topics: heating, cooling, humidifying, dehumidifying, cleaning, ventilating and electrical.

OBJECTIVE OF THE STUDY

This research assessed the skills gap identified by the Refrigeration and Air-Conditioning (RAC) TVET-Based curriculum at TESDA Region 7, as basis for enhance module. Specifically, this answered the following: the profile of the respondents and their level of Refrigeration and Air-Conditioning competencies. The researcher used descriptive research method to gather the information about the level of refrigeration and air-conditioning (RAC) technicians' competencies together with sets of questionnaires as data gathering instruments. The data gathered used processed and analyzed utilizing the appropriate statistical software utilizing 0.05 level of significance. The results of the study served as basis design intervention.

RESULTS AND DISCUSSION

Profile of the respondents

Figure 1 presents the age of the refrigeration and air-conditioning technicians in five different RAC service center in Metro Cebu.

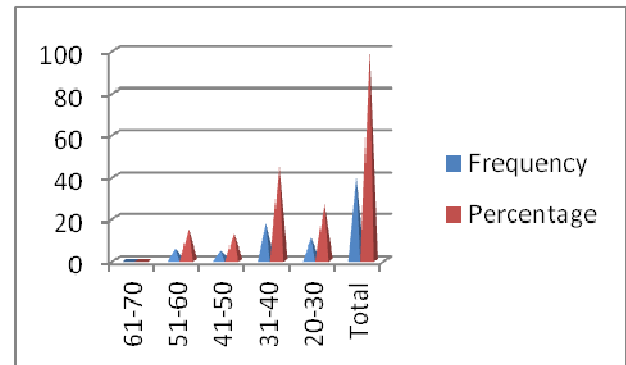
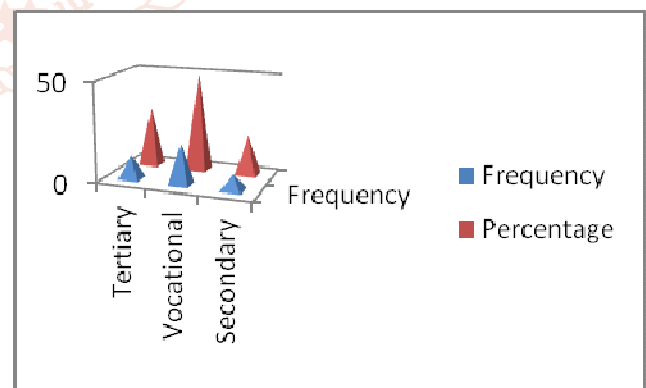


Figure 1 shows the age profile of the Refrigeration and Air-conditioning technicians in 4 different service centers and trainees/students. The data revealed that out of 40 RAC technicians, majority of them were ranged from 31-40 or 45 percent of the overall respondents and considered as millennial technicians. It was then followed by another set of age ranged from 20-30 or 27 percent of the respondents which also consider as millennial. Further, 6 or 15 percent of the respondents were belongs to the ranged from 51-60 and the remaining respondents fell on the aged ranged from 41-50 which consider as the generation X technicians. This implies that majority of the respondents were millennial. According to Pollak (2015), millennial are productive individual if they are empowered and provided with training and development, then they might excel in their profession and become productive.

Highest Educational Attainment

Figure 2 displays the highest educational attainment of the respondents group.



As shown in Figure 2 the highest educational attainment of the Refrigeration and Air-conditioning technicians in 4 different service centers and trainees/students. It shows that 12 or 30 percent of the respondents were in the tertiary level. Then followed by 20 or 50 percent who were vocational graduates. Further, there were 8 or 20 percent of the respondents were graduates in secondary education. This implies that majority of the respondents were vocational graduates. Hence, they were equipped with the skills they need to become competent refrigeration and air-conditioning technician. However, tertiary graduates, with 4 years of specialization in RAC technology were second in

highest educational attainment. Therefore, bachelor's degree in RAC is not mandatory to become a RAC technician.

Appropriate Training and Seminars Attended

Table 3 shows the appropriate training and seminars attended by the Respondents group.

Seminars/Trainings	Frequency f	Percentage %
Installation of RAC Electrical Components	24	60
Installation of RAC Mechanical Components	28	70
Service and Maintenance of RAC components	20	50
Troubleshoot and Repair of RAC Equipments	25	62
Start-up and Commissioning of RAC Equipment	27	67

Figure 3 shows the appropriate training and seminars attended by the respondents group. Data revealed that majority of the respondents 28 or 70 percent were able to attend the installation of RAC mechanical components. Then followed by item 5 which is start-up and commissioning of RAC equipment, item 4 troubleshoot and repair of RAC equipments, item 1 installation of RAC electrical components and lastly item 3 which refers to service and maintenance of RAC components. This implies that there were more than half of the respondents were able to participate on appropriate training and seminars related to refrigeration and air-conditioning. It is very clear that most of the respondents were keen to improve their understanding and knowledge to the new trends and discovery related to refrigeration and air-conditioning.

Figure 4 shows the qualifications of the respondents group. Qualifications are also included to determine their competence to be a RAC technician.

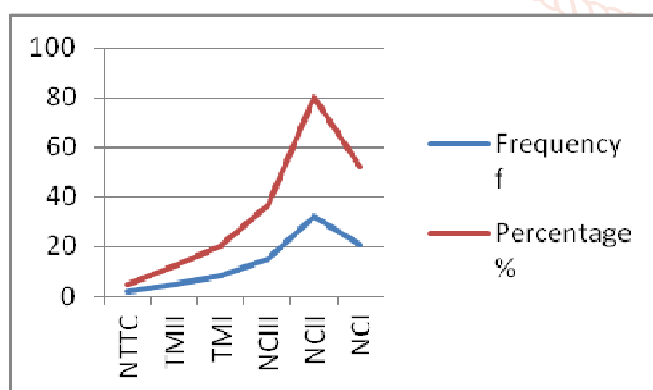


Figure 4 shows the qualifications of the respondents group. Based on the data gathered, all the RAC technicians were qualified to teach refrigeration and air-conditioning. As mandated by Technical-Vocational Education and Training, every technician must have the basic qualification which is the National certificate 2 or NCII. Further, there are 2 or 5 percent of the respondents have National TVET Trainer Certificate or NTTC holder, 5 or 12 percent of the respondents have Trainers Methodology II, 8 or 20 percents have Trainer Methodology I, 15 or 37 percent have National

Certificate III and lastly 21 or 52 percent of the respondents have National Certificate 1. This implies that the respondents except the trainees, have the competence to deliver and teach the refrigeration and air-conditioning.

LEVEL OF RAC COMPETENCIES OF THE GROUP RESPONDENTS

The basic competencies refer to non-technical skills (knowledge, skills and attitudes) that everybody will need in order to perform satisfactorily at work and in society and are considered portable and transferable irrespective of jobs and industrial settings. These competencies are integrated with 21st century skills, referring to a broad set of knowledge, skills, work habits, and character traits believed to be critically important to success in today's world, particularly in contemporary careers and workplaces.

Common competencies on the other hand covers the knowledge, skills and attitudes in identifying, requesting and receiving construction materials and tools based on the required performance standards.

While core competencies cover the knowledge, skills and attitudes to safely install the main packaged-type air-conditioning unit (PACU) components and units as well as accessories based on manufacturer's recommendations. It also includes site survey, installation of electrical and piping systems.

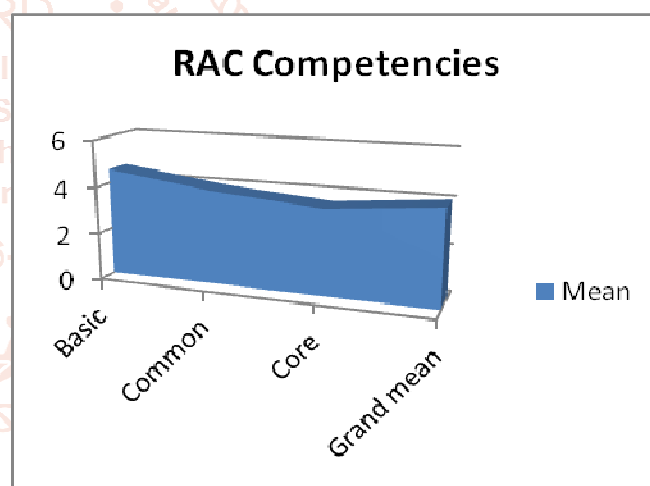


Figure 5 shows the summary of the Level of RAC Competencies of the group respondents. The data revealed that the respondents were well knowledgeable in terms of basic competencies refer to non-technical skills (knowledge, skills and attitudes). This implies that group respondents were fully understand the competencies based on the basic competencies this includes the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements. However, the respondents' knowledge in terms of common and core competencies were tracked as knowledgeable. This implies that group respondents were not yet fully acquire the skills and knowledge of these two. Overall the RAC competencies of the respondents got an overall weighted mean of 4.08 which verbally described as knowledgeable. Therefore, the data suggest that there is a need for them to continue develops their skills and knowledge on the least acquires competences.

SIGNIFICANT RELATIONSHIP OF THE PROFILE AND RAC COMPETENCIES OF THE GROUP RESPONDENTS

Significant Relationship of the Profile and RAC Competencies

RAC Competencies	Degrees of Freedom	Chi-Square Test of Independence		Decision	Remarks
		Pvalue	Level of Significance = 0.05, two- tailed		
Basic Competencies	16	0.069175294	> 0.05	Do not Reject Ho	No Significance
Common Competencies	16	0.298442739	> 0.05	Do not Reject Ho	No Significance
Core Competencies	16	0.371529384	> 0.05	Do not Reject Ho	No Significance

Table 2 shows the significant relationship of the profile of the group respondents and the RAC competencies in terms of basic, common and core competencies. The data revealed that there is a significant relationship between the profile and the RAC competencies of the group respondents. Moreover, the P value was more than to the level of significance. This implies that the profile of the respondents directly influence the competencies of the group respondents. Therefore, the age, educational attainment, trainings and seminars attended and their qualification are necessary to be a competent RAC technicians. Thus the null hypothesis was not rejected. Hence, there is significant relationship.

CONCLUSIONS

Based on the aforementioned findings, it was concluded that the group respondents were not well knowledgeable in terms of common and basic competencies. Thus, there is still a need to improve their skills and knowledge in terms of refrigeration and air-conditioning. Although, most of them qualified to become a RAC technician but still the data suggest that they need to refresh and improve their skills and knowledge especially in common and core competencies.

RECOMMENDATION

It is recommended that the curriculum revision and continuous professional development of the RAC technicians are highly suggested to improve the learning outcomes of our Technical Education and Skill Development Authority (TESDA) graduates and improve the productivity, skills and knowledge specialization of our RAC technicians. This research study might be deliberated by the TESDA officials, assessors and other stakeholders to revisit different curriculums to measure the competence of our skilled technicians.

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